

Educational Effectiveness of an HIV Pretest Video for Adolescents: A Randomized Controlled Trial

AUTHORS: Yvette Calderon, MD, MS,^{a,b} Ethan Cowan, MD, MS,^{a,b} Jillian Nickerson, BA,^a Sheba Mathew, MD,^a Jade Fetting, MS,^a Michael Rosenberg, MD, PhD,^{c,d} Christopher Brusalis, BA,^a Katherine Chou, MD, MS,^c Jason Leider, MD, PhD,^{e,f} and Laurie Bauman, PhD^d

Departments of ^aEmergency Medicine, ^bPediatrics, and ^cInternal Medicine, Jacobi Medical Center, Bronx, New York; and ^dDepartments of ^bEmergency Medicine, ^aPediatrics, and ^fInternal Medicine, Albert Einstein College of Medicine, Bronx, New York

KEY WORDS

HIV, education, video, emergency department, adolescent sexual behavior

ABBREVIATION

ED—emergency department

Dr Calderon is guarantor; Drs Calderon and Cowan had full access to data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis; all authors were involved in obtaining funding, the conception and design of the study, interpretation of the data, critical revision of the manuscript, and final approval of the submitted manuscript; and Drs Calderon, Cowan, Leider, and Bauman were involved in developing the intervention, study supervision, and drafting the manuscript.

This trial has been registered at www.clinicaltrials.gov (identifier NCT00851539).

www.pediatrics.org/cgi/doi/10.1542/peds.2010-1443

doi:10.1542/peds.2010-1443

Accepted for publication Jan 27, 2011

Address correspondence to Yvette Calderon, MD, MS, Jacobi Medical Center, Building 6 Room 1B27, Bronx, NY 10461. E-mail: ycal333@yahoo.com

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2011 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: *The authors have indicated they have no financial relationships relevant to this article to disclose.*

Funded by the National Institutes of Health (NIH).



WHAT'S KNOWN ON THIS SUBJECT: Adolescents are affected disproportionately by HIV. An urban emergency department provides a venue for HIV testing and counseling. Innovative approaches are needed to normalize HIV testing and improve HIV knowledge among adolescents.



WHAT THIS STUDY ADDS: The results demonstrate that video-based educational messages tailored toward adolescents improve their HIV knowledge and increase HIV-testing rates within an emergency department.

abstract



OBJECTIVE: The goal of this study was to compare the effectiveness of a youth-friendly HIV video with in-person counseling in conveying HIV knowledge and obtaining consent for HIV testing among adolescent patients of an urban emergency department.

METHODS: A 2-armed, randomized controlled trial was conducted on a convenience sample of 200 stable, sexually active people aged 15 to 21 years in an urban emergency department. Participants in both the in-person counseling group and the video intervention group completed preintervention and postintervention HIV knowledge measures. HIV knowledge was the primary outcome measure, and consent for HIV testing was the secondary outcome. Characteristics associated with voluntary HIV testing were identified.

RESULTS: Of 333 eligible people, 200 agreed to participate. There was no difference in preintervention HIV knowledge scores between groups. Mean postintervention knowledge scores differed significantly between the video (78.5% correct) and the counselor (66.3% correct) ($P < 0.01$) groups. Overall, 51% of the video group accepted HIV testing compared with 22% in the control group ($P < .01$). Watching the video (OR: 3.6 [95% CI: 1.8–7.2]), being female (OR: 2.1 [95% CI: 1.0–4.2]), engaging in oral sex (OR: 2.8 [95% CI: 1.4–5.9]), and being older than 18 years (OR: 3.8 [95% CI: 1.8–7.8]) were all positively associated with testing.

CONCLUSIONS: A youth-friendly HIV educational video improved adolescents' HIV knowledge and increased their participation in HIV testing more than in-person counseling. video-based HIV counseling can perform as well or better than in-person counseling for adolescents in the ED. *Pediatrics* 2011;127:911–916

People living with HIV achieve better health outcomes when diagnosed and treated earlier in the course of their disease.¹ A person that knows his or her HIV status is also 3.5 times less likely to transmit the disease than someone unaware.² Yet, ~21% of all HIV-positive people remain unaware of their infection.³ In attempting to reduce the global impact of HIV, public health policies have focused on ways to increase the number of people tested for this disease. In 2006, the Centers for Disease Control and Prevention revised its recommendations to incorporate voluntary HIV testing as a more routine part of medical care for all patients aged 13 to 64 years.³ Despite these guideline changes, a 2009 study found that the percentage of adults 18 to 64 years of age who report being tested within the past year had not changed since 2000, suggesting that new strategies are needed to encourage patients to get tested and remove barriers to testing.⁴

Although many state laws aim to streamline the HIV-testing process through opt-out and/or verbal informed consent, the Centers for Disease Control and Prevention still recommends pretest HIV information be provided to patients before undergoing testing. Using a video to provide pretest HIV education can permit all-hours access to testing and provide consistent information at a health literacy level appropriate to the population.⁵ A video-based education model among men with multiple partners has even been shown to be cost-effective.⁶ Project BRIEF has demonstrated the effectiveness of a multimedia model for high-volume HIV testing and counseling among adult patients of an urban emergency department (ED).^{5,7,8} The present study was designed to address the specific needs of adolescents, a population that accounts for an estimated 20 000

new HIV infections each year.⁹ As a group, adolescents engage in high-risk social practices and are less likely to use barrier prophylaxis, placing them at increased risk for contracting HIV. Teenagers are less likely to use condoms on a consistent basis and more likely to combine sexual activity with drug or alcohol use than any other age group.^{10,11} Routine HIV-testing programs that address the specific needs of adolescents can reduce a significant age-defined health disparity caused by HIV.¹²

Inner-city EDs provide unique venues for a combined HIV-testing and education program aimed at sexually active youth.¹³ EDs often serve as primary care facilities and trusted points of care for at-risk populations, including black and Hispanic teens.^{14,15} The advent of rapid oral HIV testing has reduced the time and burden of HIV testing in EDs, where immediate follow-up and linkage into HIV care is accessible. As a first step in developing HIV-prevention strategies for adolescents that complement HIV testing, the present study examined whether a video developed using qualitative research methods could convey HIV pretest information effectively and improve HIV-testing rates beyond in-person counseling.

METHODS

Study Design

A 2-armed, randomized controlled trial was conducted in which the control group received in-person HIV counseling and the intervention group viewed an HIV educational video developed through qualitative research with Bronx teenagers. All participants completed preintervention and postintervention HIV knowledge measures. The research protocol received approval from the Albert Einstein College of Medicine Institutional Review Board.

Video Intervention

Qualitative data from semistructured individual interviews with 100 Bronx adolescents were used to help develop the video content. The 4-minute educational video contained the 7 essential elements required for a pretest counseling session according to New York State law.¹⁶ These elements consist of explanations of HIV transmission, definitions of AIDS and HIV infection, the nature and meaning of the HIV test, benefits of testing, reporting results to the New York City Department of Health, partner notification, and definitions of voluntary and mandatory testing. Local adolescent actors aged greater than 18 years, as well as a Project BRIEF HIV counselor, acted in the video.

Selection of Participants

Patients were selected from the adult (aged 18–21 years) and pediatric (aged 15–17 years) EDs and the urgent care center of Jacobi Medical Center, a Level 1 trauma and tertiary care center located in Bronx, New York. Recruitment took place between 9 AM and 8 PM Monday through Friday from July 2008 to November 2008. Inclusion criteria required that patients be sexually active, aged 15 to 21 years, and speak English. Patients were excluded if they were medically unstable, in obvious pain, unable to understand the consent process, did not speak English, were known to be HIV positive, or had been tested within the past 6 months. Patients who refused to participate completed a short, anonymous refusal form, which captured their demographic information and reason for refusal.

Study Procedures

Trained research assistants approached all patients who appeared to be between the ages of 15 and 21 years in the waiting areas and treatment

rooms of both the adult and pediatric EDs. If parents or guardians were present, they were asked to leave the room to give the adolescent privacy. The research assistants followed a script to describe the study to obtain patients' informed consent. The institutional review board granted a waiver of parental consent to protect teens from having information about risk behaviors disclosed to parents. Interested patients completed a confidential questionnaire to determine eligibility. Eligible patients who agreed to participate provided either written informed consent^{17–20} or assent.^{15,16,21} All enrolled participants completed the preintervention knowledge survey. Patients were randomly assigned to either routine in-person counseling or video using the patient as the unit of randomization. The randomization allocation schedule was generated using a standard computer-generated block randomization routine (www.randomization.com). Group assignments were placed in sealed opaque envelopes that were opened sequentially after patients signed informed consent for the study.

Those randomized to the standard-of-care group received in-person HIV counseling from an HIV counselor trained to provide age-appropriate, culturally sensitive education and counseling. Those in the intervention group watched the pretest HIV educational video. All participants completed the intervention knowledge survey a second time to discern a change in knowledge. Participants then completed a satisfaction questionnaire. All participants were offered an optional HIV test after they completed the study. Participants randomized to the intervention video group who wished to be tested for HIV at the conclusion of the study received in-person pretest HIV counseling from a trained counselor. This second in-person session was re-

quired by the institutional review board to ensure that both groups received the standard of care before testing. Once counseled, all participants agreeing to be tested for HIV received a rapid oral HIV test, test results, and in-person posttest counseling. All participants also viewed an educational posttest counseling condom demonstration video.

Outcome Measures

The primary outcome, patient understanding of HIV pretest information, was determined by quantitative scores on the written examination (0%–100%). The 10-question knowledge form was adopted from a validated teen-specific measure created by Carey and Schroder²¹ and questions created by the New York State Department of Health.¹⁷ A panel of experts (Drs Calderon, Cowan, Leider, and Bauman) decided by consensus to include questions in the final measure that would evaluate the knowledge patients needed to have before providing informed consent for HIV testing. This adapted true-false knowledge measure was written at a 6th grade level as determined using Microsoft Word's Flesch-Kincaid grade level instrument (Microsoft Corp, Redmond, WA). Satisfaction with the testing procedures was assessed using six 5-point ordinal scale questions. The secondary outcome was the rate of participation in voluntary rapid HIV testing for each group.

Sample Size

Sample size was determined a priori on the basis of an estimated 5% difference in mean HIV knowledge scores and an SD of 12%. The 5% difference was chosen because the authors believed that every question on the HIV knowledge measure had equal significance and any improvement in knowledge that patients attained before signing informed consent was both

clinically and ethically important. Group sample sizes of 92 achieve 80% power to detect a 5% difference in mean HIV knowledge scores with SDs of 12% and an α value of .05 using a 2-sample Student's *t* test. Assuming a dropout rate of 10%, a total of 202 participants would be needed. Sample size requirements were calculated by using PASS 2004 (NCSS, Kaysville, UT).

Statistical Methods

Data were recorded in an electronic database by using Microsoft Excel (Microsoft Corp, Redmond, WA). Data obtained from patients were entered according to patient subject number without any specific identifiers. This method of data management was selected to ensure patient confidentiality.

Baseline characteristics of the in-person counseling and video groups were analyzed using descriptive statistics. Mean and SDs were calculated for normally distributed continuous variables and proportions for categorical variables. Normality of HIV knowledge scores was assessed using the Shapiro-Wilk normality test and graphical methods. Mean scores on the HIV knowledge measure were compared using Student's *t* test.

A multivariate logistic regression model was built to identify participant characteristics associated with agreement to be tested for HIV. The dependent variable was set as agreement to be tested for HIV. Univariate analysis was used to identify those covariates moderately associated with the outcome. For covariates with >2 outcomes, dummy variables were created for model insertion. Covariates with *P* values of $<.25$ were included in the preliminary multivariate model. In this preliminary multivariate model, covariates not associated with the dependent variable at a *P* value of $<.05$ were sequentially removed and the differ-

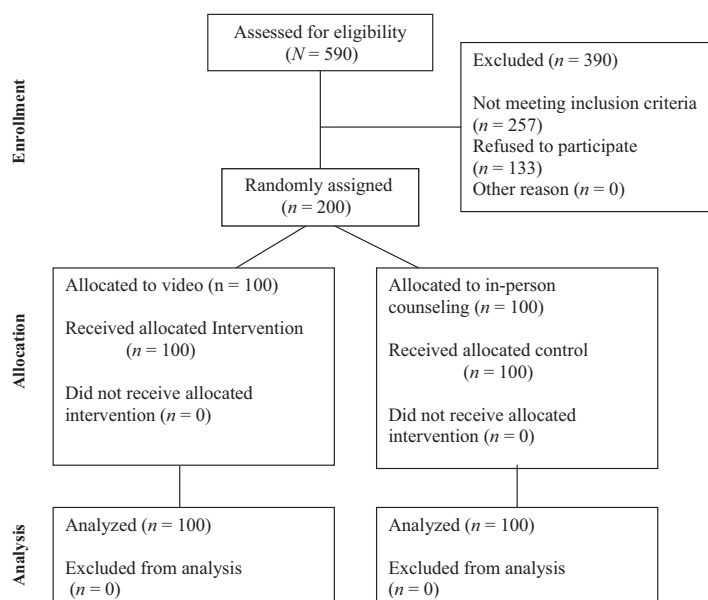


FIGURE 1
Profile of the randomized controlled trial.

ence in models tested using the likelihood ratio test. This process of deleting, refitting, and verifying was performed until all significant variables were included in the final model. All statistical data were analyzed by using Stata 10.0 (Stata Corp, College Station, TX).

RESULTS

Of 590 patients approached, 333 (56.4%) were eligible for study entry (Fig 1). Of the 333 eligible patients, 200 (60.1%) agreed to participate in the study and were randomly assigned evenly to the 2 study arms.

Main Outcomes

Patients in the in-person counseling and video groups were similar in terms of age, gender, race, ethnicity, and HIV risk factors (Table 1). Of the 105 male participants, 11 (10.5%) men reported having sex with men; subjects in this group were evenly divided, comprising 11% of the counselor group and 9% of the video group. There was no significant difference in preintervention HIV knowledge scores between the groups. Postintervention

mean HIV knowledge scores were higher in the video group compared with the routine informed consent group (78.5% and 66.3%, respectively; difference of 12.2% [$P < .01$; 95% confidence interval (CI) for the difference: 3.2%–16.5%]) (Fig 2).

TABLE 1 Population Characteristics and HIV Risk Factors

	video Group, % (N = 100)	Counselor Group, % (N = 100)	P
Age < 18 y	58	66	.244
Female gender	48	47	.887
Race			.175
American Indian	3.0	2.0	
Asian	2.0	5.0	
Black	39	25	
Native Hawaiian	0	1.0	
White	9	16	
Other	48	51	
Hispanic	41	52	.119
Previous HIV test	30	40	.138
Vaginal sex in previous year	96	93	.352
Anal sex in previous year	35	28	.287
Oral sex in previous year	49	40	.200
Multiple sexual partners	63	64	.883
Bisexual	6	7	.774
MSM	11	9	.725

MSM indicates men having sex with men.

Secondary Outcomes

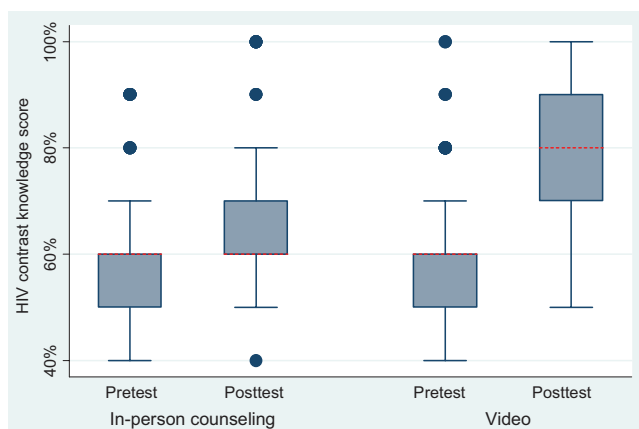
The video also increased adolescent participants' willingness to be tested for HIV over in-person counseling. More participants in the video group agreed to be tested for HIV than in the in-person counseling group (51% and 22%, respectively; $P < .01$). Watching the video, female gender, having oral sex or multiple sexual partners, and being older than 18 years were all associated with acceptance of HIV testing (Table 2). No patients tested positive for HIV.

Participants who viewed the video were more satisfied with their experience than those who spoke with a counselor. The counselor group had an average satisfaction score of 25.4 of 30 compared with an average score of 28.6 of 30 for the intervention group ($P < .0001$).

DISCUSSION

These data provide encouraging evidence of the acceptability of video-based HIV education among adolescent ED patients. Patients have previously shown higher satisfaction scores with video education compared with a counselor.¹⁸ In the present study, creating a video with community-based participatory research in our Bronx adolescent community proved to be an effective educational tool in an ED encounter. In addition to modest increases in HIV knowledge scores, teens were overwhelmingly satisfied with the video. Even after adjusting for other factors, watching the video had a much greater association with testing than did in-person counseling. The video demonstrates the need for HIV-prevention strategies to engage with existing cultural and social factors specific to a given community.

Despite the promising findings of this study, there are some limitations. The measure used to evaluate HIV knowl-

**FIGURE 2**

Box plot of HIV knowledge scores grouped according to mode of consent. The red dashed lines represent the medians, and the boxes include the interquartile range. Filled dots represent outlying data points. The whisker bars approximate the 95% CIs.

TABLE 2 Factors Associated With HIV Testing

	aOR	95% CI	P
video group	3.6	1.8–7.2	<.001
Female	2.1	1.0–4.2	.041
gender			
Aged > 18	3.8	1.8–7.8	<.001
y			
Oral sex	2.8	1.4–5.9	.004
Multiple	2.8	1.3–6.0	.007
sexual			
partners			
White	1.0	Reference	—
Black	5.6	1.5–21.2	.011
Other race	3.9	1.1–14.0	.035

aOR indicates adjusted odds ratio.

edge, although partly adapted from a validated, teen-targeted knowledge measure, was not a formally validated tool. Youth participation was lower than expected, although participation rates were comparable to other studies on adolescent ED patients.^{19,20} It is possible that the 133 patients who refused participation could have introduced selection bias; however, there was no significant difference in age,

race, gender, or HIV risk factors between study participants and those who refused (data not shown). Although unmeasured variables may have differed between participants and those who refused, we believe that the similarities in all measured sociodemographic factors lessen the likelihood of significant selection bias. Also, the effect of the video intervention can only be stated for the Bronx community in which it was developed.

Regardless of testing method, it is important that people being tested for HIV have the requisite pretest knowledge to provide adequate informed consent. According to the Centers for Disease Control and Prevention, this means “an explanation of HIV infection and the meanings of positive and negative test results” and “easily understood informational materials should be made available.”³ In New York State, before testing, people must also be informed and understand 7 key pieces of

information, including key definitions, the benefits of testing, and partner notification procedures.¹⁶ A video can provide this information in a consistent and culturally appropriate way. video messaging in ED-based, adolescent-focused HIV testing can also support public health policies that promote more streamlined HIV testing in both adult and pediatric EDs. As the ability of video-based education to improve adolescents’ HIV knowledge becomes evident, research can focus on linking such advancements in knowledge to effective and lasting changes in sexual health behaviors. The combination of video-based HIV education and prevention has the potential to complement HIV testing to reduce the spread of HIV in a manner that proves feasible to health care providers.

CONCLUSIONS

A youth-friendly HIV educational video tool reduced deficiencies in adolescents’ HIV knowledge and increased their participation in HIV testing to a greater extent than in-person counseling. These findings demonstrate the successful application of video in ED-based HIV testing for Bronx adolescents. More work is needed to incorporate video tools into behavioral interventions aimed at adolescents that will complement testing alone.

ACKNOWLEDGMENT

Funding for this study was provided by National Institutes of Health Institute of Child Health and Human Development grant 5K23-HD054315.

REFERENCES

- Rothman RE, Ketlogetswe KS, Dolan T, Wyer PC, Kelen GD. Preventive care in the emergency department: should emergency departments conduct routine HIV screening? A systematic review. *Acad Emerg Med*. 2003;10(3):278–285
- Marks G, Crepaz N, Janssen RS. Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA. *AIDS*. 2006;20(10):1447–1450
- Branson BM, Handsfield HH, Lampe MA, et al. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR Recomm Rep*. 2006;55(RR-14):1–17
- Henry J. Kaiser Family Foundation. *Views and Experiences With HIV Testing in the U.S.: Survey Brief*. Washington, DC: Kaiser Family Foundation; 2009
- Calderon Y, Haughey M, Bijur PE, et al. An edu-

6. Sweat M, O'Donnell C, O'Donnell L. Cost-effectiveness of a brief video-based HIV intervention for African American and Latino sexually transmitted disease clinic clients. *AIDS*. 2001;15(6):781–787
7. Calderon Y, Haughley M, Leider J, Bijur PE, Gennis P, Bauman LJ. Increasing willingness to be tested for human immunodeficiency virus in the emergency department during off-hour tours: a randomized trial. *Sex Transm Dis*. 2007;34(12):1025–1029
8. Calderon Y, Leider J, Hailpern S, et al. High-volume rapid HIV testing in an urban emergency department. *AIDS Patient Care STDS*. 2009;23(9):749–755
9. Hall HI, Song R, Rhodes P, et al. Estimation of HIV incidence in the United States. *JAMA*. 2008;300(5):520–529
10. Manning WD, Flanigan CM, Giordano PC, Longmore MA. Relationship dynamics and consistency of condom use among adolescents. *Perspect Sex Reprod Health*. 2009;41(3):181–190
11. Patrick ME, Maggs JL. Does drinking lead to sex? Daily alcohol-sex behaviors and expectancies among college students. *Psychol Addict Behav*. 2009;23(3):472–481
12. Rotheram-Borus MJ. Expanding the range of interventions to reduce HIV among adolescents. *AIDS*. 2000;14(suppl 1):S33–S40
13. Alpert PL, Shuter J, DeShaw MG, Webber MP, Klein RS. Factors associated with unrecognized HIV-1 infection in an inner-city emergency department. *Ann Emerg Med*. 1996;28(2):159–164
14. Rothman RE. Current Centers for Disease Control and Prevention guidelines for HIV counseling, testing, and referral: critical role of and a call to action for emergency physicians. *Ann Emerg Med*. 2004;44(1):31–42
15. Bauman LJ, Silver EJ, Stein RE. Cumulative social disadvantage and child health. *Pediatrics*. 2006;117(4):1321–1328
16. New York State Public Health Law. Article 27-F. Available at: http://law.onecle.com/new-york/public-health/PBH0A27-F_A27-F.html. Accessed March 7, 2011
17. New York State Department of Health. 100 questions and answers about HIV/AIDS. Available at: www.health.state.ny.us/diseases/aids/facts/questions/docs/100questions.pdf. Accessed January 5, 2011
18. Oermann MH. Effects of educational intervention in waiting room on patient satisfaction. *J Ambul Care Manage*. 2003;26(2):150–158
19. Walton MA, Chermack ST, Shope JT, et al. Effects of a brief intervention for reducing violence and alcohol misuse among adolescents: a randomized controlled trial. *JAMA*. 2010;304(5):527–535
20. Bernstein J, Heeren T, Edward E, et al. A brief motivational interview in a pediatric emergency department, plus 10-day telephone follow-up, increases attempts to quit drinking among youth and young adults who screen positive for problematic drinking. *Acad Emerg Med*. 2010;17(8):890–902
21. Carey MP, Schroder KE. Development and psychometric evaluation of the brief HIV Knowledge Questionnaire. *AIDS Educ Prev*. 2002;14(2):172–182

TISSUE TRANSPLANTATION: At almost every Children's Hospital in the U.S., several children are being treated for complications of transplantation. Achieving the right balance between prevention of tissue rejection and maintenance of some degree of immunocompetence is quite challenging. Autologous tissue-engineering, the biomechanical science of growing tissues and organs from a patient's own cells, is viewed as having the potential to transform the field of transplant medicine and offer new treatment options for a variety of conditions. According to an article in *The Lancet* (377;9772:March 8, 2011), researchers now report that the practice has been successfully used to treat urethral injury in young boys. Five boys aged 10–14-years-old with urethral damage secondary to trauma underwent urethroplasty with grafts made from autologous cells grown onto a tubular scaffold. Two of the patients required subsequent surgical treatment for complications (transurethral incision for stenosis and pubovesical sling for pelvic disruption), but all five eventually achieved complete urinary continence (follow-up lasted 36–71 months) without the need for immunosuppressive therapy. Although additional studies and procedural modifications are in order, the implications are enormous. The success of the experiment will hopefully pave the way for future tissue grafting experiments. A future in which patients no longer need immunosuppressive medications following organ or tissue transplantation, would be fantastic indeed.

Noted by Patrick Huffer, MS-IV